

Bellwork: 5/17/13

Evaluate each logarithm:

1) $\log_3 27 = x$

$$3^x = 27$$

$$\boxed{x = 3}$$

2) $\log_2 (1/32) = x$

$$2^x = \frac{1}{32}$$

$$\boxed{x = -5}$$

3) $\log_9 3 = x$

$$9^x = 3$$

$$\boxed{x = \frac{1}{2}}$$

7-4

Practice

Form G

Properties of Logarithms

Write each expression as a single logarithm.

1. $\log_5 4 + \log_5 3$

2. $\log_6 25 - \log_6 5$

3. $\log_2 4 + \log_2 2 - \log_2 8$

4. $5 \log_7 x = 2 \log_7 x$

5. $\log_4 60 - \log_4 4 + \log_4 x$

6. $\log 7 - \log 3 + \log 6$

7. $2 \log x - 3 \log y$

8. $\frac{1}{2} \log r + \frac{1}{3} \log s - \frac{1}{4} \log t$

9. $\log_3 4x + 2 \log_3 5y$

$$\begin{aligned}
 \textcircled{8} \quad & \frac{1}{2} \log r + \frac{1}{3} \log s - \frac{1}{4} \log t \\
 & \log r^{\frac{1}{2}} \overset{*}{\oplus} \log s^{\frac{1}{3}} \overset{\div}{\ominus} \log t^{\frac{1}{4}} \\
 & \log \frac{r^{\frac{1}{2}} s^{\frac{1}{3}}}{t^{\frac{1}{4}}}
 \end{aligned}$$

$$\begin{aligned}
 \textcircled{7} \quad & 2 \log x - 3 \log y \\
 & \log x^2 \overset{\div}{\ominus} \log y^3 \\
 & \log \frac{x^2}{y^3}
 \end{aligned}$$

$$\begin{aligned}
 & \textcircled{9} \quad \log_3 4x + 2 \log_3 (5y)^2 \quad 5y \cdot 5y \\
 & \log_3 4x \overset{*}{+} \log_3 25y^2 \\
 & \log_3 4x \cdot 25y^2 \\
 & \log_3 100xy^2
 \end{aligned}$$

10. $5 \log 2 - 2 \log 2$

11. $\frac{1}{3} \log 3x + \frac{2}{3} \log 3x$

12. $2 \log 4 + \log 2 + \log 2$

13. $(\log 3 - \log 4) - \log 2$

14. $5 \log x + 3 \log x^2$

15. $\log_6 3 - \log_6 6$

Condense each expression to a single logarithm. Pg 241

13) $\log 3 - \log 8$

$\log_3 \frac{3}{8}$

15) $4\log 3 - 4\log 8$

16) $\log 2 + \log 11 + \log 7$

17) $\log 7 - 2\log 12$

$\log_3 \frac{7}{144}$

19) $6\log_3 u + 6\log_3 v$

$\log_3 u^6 v^6$

$$21) \log_4 u - 6\log_4 v$$

$$22) \log_3 u - 5\log_3 v$$

$$23) 20\log_6 u + 5\log_6 v$$

$$24) 4\log_3 u - 20\log_3 v$$

Critical thinking questions:

$$25) 2(\log 2x - \log y) - (\log 3 + 2\log 5)$$

$$26) \log x \cdot \log 2$$

